Optimizing computer-based spelling exercises

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Summary

Spelling is a complicated skill to acquire. Each and every spelling requires the speller to process the complete letter array. The initial encounter with an unfamiliar spelling obliges children to segment words into phonemes, translate phonemes into graphemes, and write the graphemes in the correct order. Subsequent occurrences enable underlying processes to become fully automatic. Efficacious computer-based exercises can assist young children in spelling acquisition. Therefore, one of the most important objectives of the current thesis is to optimize computer-based spelling exercises. Chapter 1 provides an introduction to the issues concerning the basics of spelling acquisition, differences and similarities between reading and spelling skills, characteristics of good and poor spellers, developmental theories, and spelling principles in the Dutch language.

The studies described in Chapter 2 investigate the effect of a phonological cue by means of spelling pronunciations in computer-based spelling exercises. Loan words, i.e., irregular words originating from a foreign language, are used and the focus is on poor spellers. The emphasis on the pronunciation of individual graphemes, i.e., a spelling pronunciation, is expected to aid in learning to spell highly irregular words in poor spellers. The first experiment in Chapter 2 shows no benefit of the spelling pronunciation cues. It is suggested that this finding could be due to the fact that visual-orthographic information was also simultaneously available to the speller. The idea is that the orthographic information might have overruled the effect of spelling pronunciations. Therefore, a second experiment, also described in Chapter 2, is administered in order to tease out the effects of spelling pronunciations and visual-orthographic information. The findings reveal similar effects for spelling pronunciations and visual preview. Both exercises conferred higher gains as compared to a spelling dictation exercise in which no additional cue was provided. It is suggested that the spelling pronunciations and visual preview deal with the common process of uncovering orthographic details, which is in fact the main driving force for accelerated learning.

The second experiment described in Chapter 2 is replicated and further extended in Chapter 3. The main aim of the study was to examine effects of spelling pronunciations and visual preview in the spelling of loan words of both skilled and less skilled spellers varying in spelling age. Reading skills were also taken into account in order to study possible differential effects of spelling pronunciations and visual preview between skilled and less skilled readers. Overall, spelling pronunciations appear to be as beneficial as visual preview. Interestingly, less skilled spellers from Grade 3 show to benefit most from visual preview, relative to spelling pronunciations. The findings of Chapter 2 and 3 together indicate that spelling pronunciations and previewing the spelling can both be a way to assist spellers in computer-based exercises in learning to spell orthographically unpredictable words, irrespective of age or spelling ability.

Chapter 4 investigates the effects of a phonological cue in computer-based spelling exercises for first grade less skilled spellers. A common problem that children in first grade encounter in learning to spell concerns the spelling of consonant clusters in monosyllabic words; they often tend to omit the second consonant of a cluster. The main question of the study is whether phonological cues by means of phonemic segmentation cues are more beneficial in spelling exercises than visual preview. Findings reveal that both phonemic segmentation and visual-spelling cues showed to generate word-specific effects and facilitate the learning of the correct spelling over and above normal spelling practice. It is concluded that both segmentation and visual preview are beneficial for beginning spelling by freeing mental resources to attend to and memorize the word-specific letter pattern.

Learning to spell open and closed syllable words is also one of the major stumble blocks in spelling acquisition. Chapter 5 describes a study in which the benefits of phonological and visual preview cues are examined in less skilled second grade spellers in spelling words with open and closed syllable words. Instead of phonemic segmentation cues, syllabic segmentation cues are used as a phonological cue. The findings show that the visual preview exercise is the most effective spelling exercise, relative to the syllabic segmentation and spelling dictation exercise. The findings suggest that word-specific knowledge can effectively be improved by exposure to the correct letter pattern during exercises in spelling and seems to result in lasting improvement of word-specific orthographic representations, at least for 5 weeks.

In addition to phonological information as a remedy in spelling exercises, Chapter 6 investigates effects of semantic cues. The chapter describes an experiment with the aim of examining the effect of activating the connection between the meaning and phonology in computer-based spelling exercises. Effects of activation of the semantic-phonology bonding are studied in second grade spellers. Semantic or neutral descriptions were contrasted and either provided before the process of spelling or in feedback. Visual information was available in all training conditions. Results indicate that words practiced with semantic descriptions are better spelled than words practiced with neutral descriptions, either presented before spelling or in feedback. Overall, the evidence indicates that activation of the semantic aspect of a word can be facilitative in computer-based spelling exercises.

Chapter 7 describes a study in which the effect of explicit rule instruction is examined. It has been argued that learning can either occur by analogy or by explicit instruction of the spelling rules. The question is which approach is best in learning to spell Dutch words with open and closed syllables. In a computer-based training program, rules are either explicitly provided during practice or not. Also, the participants, second grade children, practice either with a large set of exemplars or with a small set. Effects of the exercises are examined by spelling-to-dictation tests of practiced words, as well as novel transfer words, before and after the training period. The results show that explicitly provided spelling rules are supportive in learning to spelling novel words when a large set of exemplars is available during practice, but not when only a few exemplars are encountered. Children improve their spellings of transfer words as much in an expanded word set as in a limited word set practice condition. The results are taken as evidence that, when encountering many different words, explicit rules can help in learning to spell contrasting letter patterns, but overall

learning gains are similar for large and small word sets, irrespective of explicit or no-rule instruction.

Chapter 8 investigates whether the homophone effect also exists in young beginning spellers, like in adolescents and adults, and how this effect evolves across different grades and spelling levels. In homophones, a single phonological specification is connected to two orthographic representations and two meanings. This ambiguity in phoneme-grapheme correspondences is potential for confusion in reading and spelling. The homophone effect is studied by dictating homophonous and nonhomophonous words in second to fifth grade children. Percentage errors in homophones are compared with errors in nonhomophones. The results show that nonhomophones are better spelled than homophones. The homophone effect appears for all grades, spelling levels, and types of homophonic words. Results show furthermore that, as spellers get older and more experienced, the homophone effect becomes larger. The results are taken as evidence that young children already use word-specific orthographic representations at the age of eight instead of merely relying on phoneme-grapheme correspondences.

Finally, Chapter 9 provides a discussion of results and conclusions of the previously described experiments. Theoretical and practical interpretations and implications are discussed. The discussion leads to the ultimate conclusion that computer-based spelling exercises can be optimized by providing detailed specification of word characteristics (phonology, orthography, and semantics).